














Index for Function







Type	Metal shaft							
	9mm size		11mm size			20mm size		
Series	EC09E	RK09710E	EC11B	EC11E		EC20A/RK203		
Photo								
Output	Incremental							
Outline specification	Shaft types	Single-shaft			Dual-shaft	Single-shaft		
	Operating direction	Vertical	Horizontal	Vertical Horizontal	Vertical			
	Number of pulse / Number of detent	15/30	9/18 15/30	15/30 20/20	9/18 15/30 18/36		15/30	18/18
	Push switch (Travel mm)	Without with (0.5, 1.5)				Without with (0.5)		Without with (1.5)
	Optional functions	Without detent	Push-lock mechanism Push-lock switch	—	Push-lock mechanism Self-return switch Without detent		—	
	Changeover angle	—						
Dimensions (mm)	W	9.5		12.3	11.7		2.0	
	D	9.5	11.4	13.8	12		14.2	19.2
	H	4.5	7.05	5.4	4.5	8.5	4.5	10
Soldering	Manual soldering	●	●	●	●	●	●	●
	Dip soldering	●	●	●	●	●	—	●
	Reflow soldering	—			—		●	—
Lead - free※1	●	○	○	○	○	○	●	
Minimum packing unit (pcs.) ※2※3	—							
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Type	Insulated shaft		Hollow type				
	12mm size		17mm size	21mm size	22mm size	28mm size	
Series	EC12E		SRGP30	EC21A	SRGP20	EC28B	
Photo							
Output	Incremental		Incremental				
Outline specification	Shaft types	Single-shaft		Hollow shaft			
	Operating direction	Vertical Horizontal	Vertical				
	Number of Pulse / Number of detent	12/12 24/24		9/18	15/30	10/20	15/30
	Push switch (Travel mm)	Without with (0.5)		Without	—	Without	—
	Optional functions	Without detent		—			
	Changeover angle	—		20°	—	18°	—
Dimensions (mm)	W	12.4	17.5	21.6	23.6	28	
	D	13.2	18.5	21.6	23	29	
	H	5	2.3	4	4.5	4	
Soldering	Manual soldering	●	—	●	●	●	
	Dip soldering	●	—	●	●	●	
	Reflow soldering	—		●	—		
Lead - free※1	●	●	●	●	●	●	
Minimum packing unit (pcs.) ※2※3	—		400	600	100	400	
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Notes

- ※1. ● mark : This product series do not contain any lead in all materials and parts.
○ mark : This series meet Pb-free restrictions EVL and RoHS directives.
EVL : End-of-Life Vehicle RoHS : Restriction of the use of certain Hazardous Substances in electrical and electronic equipment
- ※2. Place your purchase order in N minimum package units (N: integer).
- ※3. Ask us for the export packaging unit.

Index for Function

Type	Hollow type		Hollow shaft		Magnetic		
	30mm size SRGPWJ	40×44mm size SRGPSJ	5mm size EC05E	10mm size EC10E	11mm size EM11B	20mm size EM20B	
Photo							
Output	Incremental						
Outline specification	Shaft types	Hollow shaft			Single-shaft		
	Operating direction	Vertical		Vertical Horizontal	Horizontal	Vertical	
	Number of pulse / Number of detent	16/16, 16/32	24/24	12/12	12/24	16/16	40/40
	Push switch (Travel mm)	Without		—		With (0.5)	Without / With (0.5)
	Optional functions	—			Display function		
Dimensions (mm)	Changeover angle	22.5°	15°	—			
	W	31.8	40	5.7	9.8	10.8	20
	D	32	44	2.7	12.6	11	22.25
Soldering	H	4.5	5	6.5	4.4	7.5	13
	Manual soldering	●	●	●	●	●	●
	Dip soldering	●	●	—	●	●	●
Lead - free※1	Reflow soldering	—		●	—		
	Minimum packing unit (pcs.) ※2※3	●	●	●	●	○	○
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- Power
- Push
- Slide
- Rotary
- Encoders
- Jog Shuttle
- Telephone-hook
- Detector
- Vibration/Tilt Sensors
- Dual-in-line Package Type
- Multi Control Devices
- TACT

Type	Absolute type			Hollow type	
	With Knob SRRQ	Metal shaf SRGH	Hollow shaft SRGA	EC45A / RK45A	
Photo					
Output	Absolute type				
Outline specification	Shaft types	With knob	Single-shaft	Hollow shaft	
	Operating direction	Vertical Horizontal	Vertical		
	Number of Pulse / Number of detent	—			
	Push switch (Travel mm)	Without			—
	Optional functions	—			
Dimensions (mm)	Changeover angle	22.5° 36°	40° 12.8°	15° 24° 30°	
	W	14.4	20	18	44.5
	D	15.6	19	18	45
Soldering	H	7.5	10.5	8	9
	Manual soldering	●	●	●	●
	Dip soldering	●	●	●	●
Lead - free※1	Reflow soldering	—			
	Minimum packing unit (pcs.) ※2※3	●	●	●	●
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- Incremental Type
- Absolute Type

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Notes

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 ELV : End-of-Life Vehicle RoHS : Restriction of the use of certain Hazardous Substances in electrical and electronic equipment
2. ※2. Place your purchase order in N minimum package units (N: integer).
3. ※3. Ask us for the export packaging unit.

Products Specifications

Items	9mm size metal shaft encoders	
	Model EC09E	Model RK097
Power	Operating temperature range	
Push	-30°C to +85°C	
Slide	-30°C to +70°C	
Rotary	Maximum operating current (Resistive load)	
Encoders	10mA	
Jog Shuttle	Rating	
Telephone-hook	10mA 5V DC	
Detector	1mA 5V DC	
Vibration/Tilt Sensors	Output signal	
Dual-in-line Package Type	Output of A and B signals, proportionate to phase difference	
Multi Control Devices	Output wave	
TACT		
Incremental Type	Sliding noise	
Absolute Type	<p>V1=V2=1.5V max.</p> <p>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering</p>	
	At R = 5 kΩ Chattering :5ms max. Bounce :2ms max.	
	At R = 5 kΩ Chattering :5ms max. Bounce :5ms max.	
	Insulation resistance	
	250V DC 100MΩ min.	
	Voltage proof	
	300V AC	
	Rotational torque	
	—	
	Detent torque	
	8±5 mN·m	
	10±8 mN·m	
	Push-pull strength	
	100N	
	Resistance to soldering heat	
	Manual soldering	
	300°C or less, or within 3s	
	Dip soldering	
	260°C ±5°C, 5±1s	
	Reflow soldering	
	—	
	Rotational life	
	15,000 cycles	
	30,000 cycles	
	Cold	
	-40±3°C for 240h	
	Dry heat	
	85±3°C for 240h	
	Damp heat	
	60±2°C, 90 to 95%RH for 240h	

Push-on Switch Specifications

Items	9mm size metal shaft encoders			
	Model EC09E		Model RK097	
Switch circuit · the number of contact	Single pole and single throw (Push-on)			
Travel of switch (mm)	0.5±0.3mm	1.5±0.5mm	0.5 ^{+0.7} _{-0.3} mm	1.5±0.5mm
Operating force of switch	6 ^{+2.5} ₋₂ N	4±2N	4 ⁺⁴ ₋₂ N	5±2N
Rating	10mA 5V DC		10mA 12V DC	
Contact resistance	100m Ω for initial period; 200m Ω after the end of its lifespan has been reached.			
Operating life	10,000 times min.			20,000 times min.

Products Specifications

Items	Standard type EC11B		Low-profile type EC11E		Low-profile type EC111	20mm size EC20A	
	Standard type	Double torque type	Standard type	Reflow type	Self-return switch		
Power	Operating temperature range					-30 to +85°C	-30 to +80°C
Push	Maximum operating current (Resistive load)					10mA	0.5mA
Slide	Rating					10mA 5V DC	0.5mA 5V DC
Rotary	Output signal				Self-return switch	Output of A and B signals, proportionate to phase difference	
Encoders	Insulation resistance					250V DC 100MΩ min.	50V DC 10MΩ min.
Jog Shuttle	Voltage proof					300V AC	50V AC
Telephone-hook	Rotational torque (mN·m)				3 to 30mN·m	—	
Detector	Detent torque (mN·m)		Push-pull strength (N)		—	40±20mN·m	
Vibration/Tilt Sensors	12±7mN·m	16±7mN·m	10±7mN·m	6±4mN·m	—	—	
Dual-in-line Package Type	Manual soldering					300°C or less, or within 3s	
Multi Control Devices	Resistance to soldering heat		Dip soldering		260±5°C, 5±1s	260±5°C, 5±1s	
TACT	Reflow soldering		—		Please see P.182	—	
Durability	Rotational life					15,000 cycles	30,000 cycles
Incremental Type	Cold					-40±3°C for 240h	
Absolute Type	Dry heat					85±3°C for 240h	
	Damp heat					60±2°C, 90 to 95%RH for 240h	

Push-on Switch Specifications

Items	Standard type EC11B		Low-profile type EC11E / EC111		20mm size EC20A
Switch circuit · the number of contact	Single pole and single throw (Push-on)				
Travel of switch (mm)	0.5 ^{+0.4} _{-0.3} mm	1.5±0.5mm	0.5±0.3mm	1.5±0.5mm	
Operating force of switch N	6±3N	5±2N	6 ^{+2.5} ₋₂ N	4±2N	
Rating	DC 16V 3A (10mA 16V DC min ratings)		DC 16V 0.5A (1mA 16V DC min ratings)		
Contact resistance	100m Ω for initial period; 200mΩ after the end of its lifespan has been reached				
Operating life	25,000 times min.	20,000 times min.			

Products Specifications

Output Wave

Standard type EC11B		Low-profile type EC11E		Low-profile type EC111	20mm size EC20A																
Standard type	Double torque type	Standard type	Reflow type	Self-return switch																	
<p>EC11B, EC11E 30 detents, 15 pulse EC11B 20 detents, 20 pulse</p> <p>A signal OFF ON A signal ON OFF</p> <p>B signal OFF ON B signal ON OFF</p> <p>Detent stability point CW direction</p> <p>The stable detent position cannot be identified in phase B. EC11E 18 detents 9 pulse EC11E 36 detents 18 pulse</p> <p>A signal OFF ON</p> <p>B signal OFF ON</p> <p>CW direction Detent stability point</p> <p>Counter-Clockwise Clockwise</p> <p>0°</p> <p>B C A</p>					<table border="1"> <thead> <tr> <th>Shaft rotational Direction</th> <th>Signal</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Clockwise</td> <td>A (Terminal A-C)</td> <td></td> </tr> <tr> <td>B (Terminal B-C)</td> <td></td> </tr> <tr> <td rowspan="2">Counter-clockwise</td> <td>A (Terminal A-C)</td> <td></td> </tr> <tr> <td>B (Terminal B-C)</td> <td></td> </tr> <tr> <td colspan="2"></td> <td>The broken line shows Detent position</td> </tr> </tbody> </table>	Shaft rotational Direction	Signal	Output	Clockwise	A (Terminal A-C)		B (Terminal B-C)		Counter-clockwise	A (Terminal A-C)		B (Terminal B-C)				The broken line shows Detent position
Shaft rotational Direction	Signal	Output																			
Clockwise	A (Terminal A-C)																				
	B (Terminal B-C)																				
Counter-clockwise	A (Terminal A-C)																				
	B (Terminal B-C)																				
		The broken line shows Detent position																			

Sliding Noise

Standard type EC11B		Low-profile type EC11E		Low-profile type EC111	20mm size EC20A
Standard type	Double torque type	Standard type	Reflow type	Self-return switch	
<p>V1=V2=1.5V max.</p> <p>Test circuit Output waveform</p> <p>5V DC</p> <p>R R</p> <p>Terminal A Terminal B</p> <p>Encoder</p> <p>Terminal C</p> <p>ON OFF ON</p> <p>Sliding direction</p> <p>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering</p>					<p>V1=V2=1.5V max.</p> <p>Test circuit Output waveform</p> <p>5V DC</p> <p>R R</p> <p>Terminal A Terminal B</p> <p>Encoder</p> <p>Terminal C</p> <p>ON OFF ON</p> <p>Sliding direction</p> <p>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering</p>
<p>At R = 5kΩ</p> <p>Chattering :2ms max.</p> <p>Bounce :2ms max.</p>		<p>At R = 5kΩ</p> <p>Chattering :3ms max.</p> <p>Bounce :2ms max.</p>		<p>At R = 5kΩ</p> <p>Chattering :8ms max.</p> <p>Bounce :5ms max.</p>	

Power

Push

Slide

Rotary

Encoders

Jog Shuttle

Telephone-hook

Detector

Vibration/Tilt Sensors

Dual-in-line Package Type

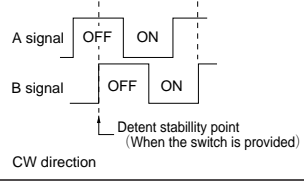
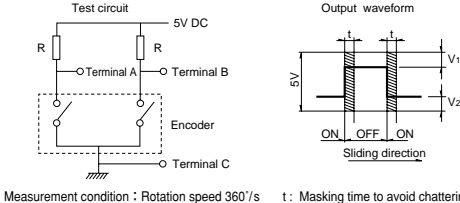
Multi Control Devices

TACT

Incremental Type

Absolute Type

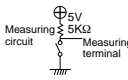
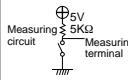
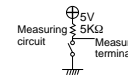
Products Specifications

Items	12mm size insulated shaft encoders		
	Standard detent	Without detent	With switch
Power	Operating temperature range -10°C to +60°C		
Push	Maximum operating current (Resistive load) 5mA		
Slide	Rating 0.5mA 5V DC		
Rotary	Output signal Output of A and B signals, proportionate to phase difference		
Encoders	Output wave 		
Jog Shuttle	Electrical performance		
Telephone-hook	Sliding noise V1=V2=1.5V max. 		
Detector	At R = 10kΩ Chattering :3ms max. Bounce :2ms max.		
Vibration/Tilt Sensors	Insulation resistance 50V DC 10MΩ min.		
Dual-in-line Package Type	Voltage proof 50V AC		
Multi Control Devices	Rotational torque —		
TACT	Detent torque 3±2mN·m		
Incremental Type	Push-pull strength 80N		
Absolute Type	Resistance to soldering heat Manual soldering : 300°C or less, or within 3s Dip soldering : 260°C ±5°C, 5±1s Reflow soldering : —		
Durability	Rotational life 30,000cycles		
Environmental performance	Cold -40±3°C for 240h		
	Dry heat 85±3°C for 240h		
	Damp heat 40±2°C, 90 to 95%RH for 240h		

Push-on Switch Specifications

Items	12mm size insulated shaft encoders
Switch circuit · the number of contact	Single pole and single throw (Push-on)
Travel of switch	0.5 ^{+0.4} _{-0.3} mm
Operating force of switch	3 ^{+1.5} _{-1.0} N
Rating	1mA 5V DC
Contact resistance	100m Ω for initial period; 200m Ω after the end of its lifespan has been reached.
Operating life	20,000 times min.

Products Specifications

Items \ Type		SRGP30	EC21A	SRGP20	EC28B	SRGPWJ	SRGPSJ	
Operating temperature range		-40°C to +85°C		-10°C to +60°C	-40°C to +85°C	-10°C to +60°C		
Rating (max.) (Resistive load)		10mA 5V DC						
Electrical performance	Output voltage	1V max.at 5V DC,1mA (resistive load) 	2.5V max.at 5V DC,1mA (resistive load)	1V max.at 5V DC,1mA (resistive load) 	2.5V max.at 5V DC,1mA (resistive load)	1V max.at 5V DC,1mA (resistive load) 		
	Insulation resistance	100MΩ min. 100V DC	100MΩ min. 250V DC	100MΩ min. 100V DC	100MΩ min. 250V DC	100MΩ min. 100V DC		
	Voltage proof	100V AC for 1 min.	300V AC for 1 min.	100V AC for 1 min.	300V AC for 1 min.	100V AC for 1 min.		
Mechanical performance	Rotational torque		5±2.5 mN·m	16±7 mN·m	7±3 mN·m	$5 \pm \frac{5}{3}$ mN·m 7±5 mN·m 12±7 mN·m 20±10 mN·m	13±4 mN·m / 6.5±4 mN·m	20±15 mN·m
	Robustness of terminal		5N for 1 min.					
	Robustness of actuator	Pushing direction	20N	100N	40N	100N	40N	30N
		Pulling direction	20N	100N	40N	100N	40N	30N
	Vibration		10 to 55 to 10Hz/min., the amplitude is 1.5mm for all the frequencies, in the 3 direction of X, Y and Z for 2 hours respectively					
	Solderability		230±5°C, 3±0.5s					
	Resistance to soldering heat	Manual soldering	350±5°C, 3s max.	300±10°C, 3 ⁺ ±s				
Dip soldering		—	260±5°C, 5±1s					
Reflow soldering		150°C 2min max., 230°C 20s max.	—					
Durability	Operating life without load	50,000 cycles	30,000 cycles	50,000 cycles	30,000 cycles	50,000cycles		
	Operating life with load	50,000 cycles	30,000 cycles	50,000 cycles	30,000 cycles	50,000cycles		
Environmental performance	Cold	-40±2°C for 96h	-40±2°C for 240h	-20±2°C for 96h	-40±2°C for 240h	-20±2°C for 96h		
	Dry heat	85±2°C for 96h	85±2°C for 240h	85±2°C for 96h	85±2°C for 240h	85±2°C for 96h		
	Damp heat	40±2°C, 90 to 95%RH for 96h	60°C±2°C 90 to 95% RH for 240h	40±2°C, 90 to 95%RH for 96h	60°C±2°C 90 to 95% RH for 240h	40±2°C, 90 to 95%RH for 96h		

Power

Push

Slide

Rotary

Encoders

Jog Shuttle

Telephone-hook

Detector

Vibration/Tilt Sensors

Dual-in-line Package Type

Multi Control Devices

TACT

Incremental Type

Absolute Type

Products Specifications

Items		Series	EC05E	EC10E	
Operating temperature range			-30°C to +85°C		
Rating (max.) (Resistive load)			1mA 5V DC		
Electrical performance	Rating		0.5mA 5V DC		
	Output signal		Output of A and B signals, proportionate to phase difference		
	Output phase		—		
	Output type		Incremental		
	Insulation resistance		50V DC 50MΩ min.		
	Voltage proof		50V AC		
Mechanical performance	Rotational torque (mN · m)		—		
	Detent torque (mN · m)		1.6±1.3 mN · m	5±3 mN · m	
	Puch-pull styrength (N)		—		
	Resistance to soldering heat	Manual soldering		300°C or less, or within 3s	
		Dip soldering		—	260°C±5°C 3±1s
Durability	Operating life		100,000 cycles		
Environmental performance	Cold		-40±3°C for 240h		
	Dry heat		85±2°C for 240h		
	Damp heat		40±2°C, 90 to 95%RH for 240h		

Power

Push

Slide

Rotary

Encoders

Jog Shuttle

Telephone-hook

Detector

Vibration/Tilt Sensors

Dual-in-line Package Type

Multi Control Devices

TACT

Incremental Type

Absolute Type

Products Specifications

Items		Series	EM11B	EM20B	
Operating temperature range			-20°C to +85°C	-10°C to +70°C	
Rating (max.) (Resistive load)			5V DC $\pm 5\%$		
Electrical performance	Rating		5V DC $\pm 5\%$		
	Output signal		V _{HI} : +4.0Vmin. V _{LO} : 0.5Vmax (I _{sink} =5mA)		
	Output phase		A,B (Square wave)		
	Output type		Incremental		
	Instulation resistance		100V DC 100M Ω min.	250V DC 100M Ω min.	
	Voltage proof		300V AC		
Mechanical performance	Rotational torque		—	5 ± 4 mN · m	
	Detent torque		10 ± 5 mN · m	8 ± 5 mN · m	
	Puch-pull styrength		100N		
	Resistance to soldering heat	Manual soldering		300°C or less, or within 3s	
		Dip soldering		260°C or less, or within 3s	
Durability	Operating life		1,000,000 cycles	500,000 cycles	
Environmental performance	Cold		-40 ± 3 °C for 500h	-30 ± 3 °C for 240h	
	Dry heat		85 ± 3 °C for 500h	80 ± 3 °C for 240h	
	Damp heat		60 ± 3 °C, 90 to 95%RH for 500h	40 ± 2 °C, 90 to 95%RH for 240h	

Power

Push

Slide

Rotary

Encoders

Jog Shuttle

Telephone-hook

Detector

Vibration/Tilt Sensors

Dual-in-line Package Type

Multi Control Devices

TACT

Incremental Type

Absolute Type

Absolute Type Products Specifications

Items		Series		SRRO	SRGH	SRGA	EC45A
Operating temperature range		-10°C to +60°C				-30°C to +80°C	
Rating (max.) (Resistive load)		0.1A 6V DC		0.1A 12V DC		1mA 5V DC	
Electrical performance	Initial contact resistance		1 Ω max.			100 Ω max.	
	Insulation resistance		100MΩ min. 100V DC			10MΩ min. 50V DC	
	Voltage proof		100V AC for 1 min.			50V AC for 1 min.	
Mechanical performance	Rotational torque		Shall be in accordance with individual specifications.				
	Robustness of terminal		5N for 1 min.			3N for 10s	
	Robustness of actuator	Rotational direction	—			1N·m	
		Push direction	5N	100N			
	Vibration		10 to 55 to 10Hz/min., the amplitude is 1.5mm for all the frequencies, in the 3 direction of X, Y and Z for 2 hours respectively				
	Solderability		230±5°C, 3±0.5s				
	Resistance to soldering heat	Manual soldering	300±10°C, 3 ⁺¹ ₀ s	350±10°C, 3 ⁺¹ ₀ s		350°C max. 3s max.	
Dip soldering		260±5°C, 10±1s			260°C max. 5s max.		
Reflow soldering		—					
Durability	Operating life without load		10,000 cycles			30,000 cycles	
	Operating life with load Load : As rating		10,000 cycles			30,000 cycles	
Environmental performance	Cold		-20±2°C for 96h			-40°C for 240h	
	Dry heat		85±2°C for 96h			+85°C for 240h	
	Damp heat		40±2°C, 90 to 95%RH for 96h			40°C, 90 to 95%RH for 240h	

Power

Push

Slide

Rotary

Encoders

Jog Shuttle

Telephone-hook

Detector

Vibration/Tilt Sensors

Dual-in-line Package Type

Multi Control Devices

TACT

Incremental Type

Absolute Type